Northwest Arizona Rural Watershed Initiative Study

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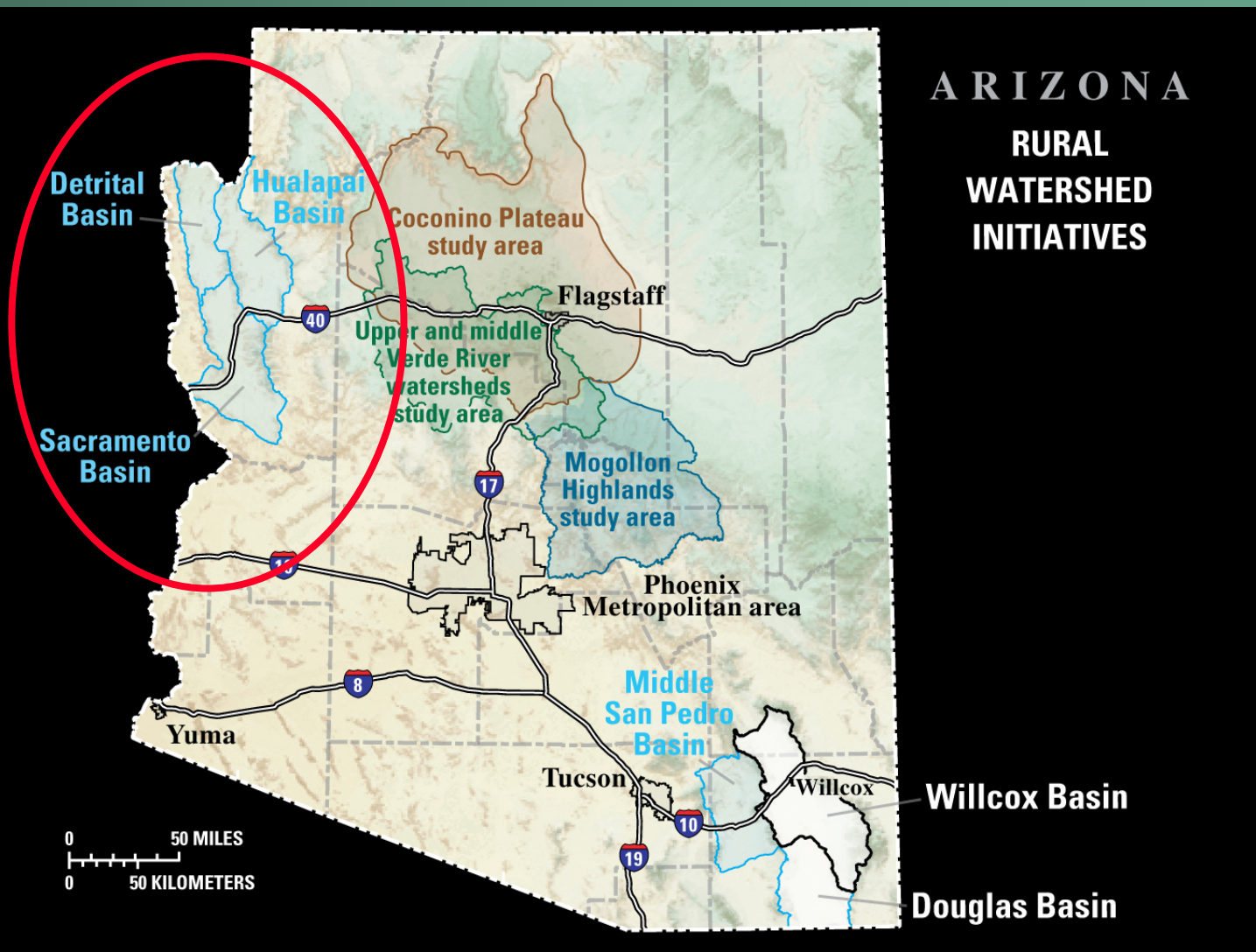
U.S. Department of the Interior
U.S. Geological Survey

Rural Watershed Initiative Study Areas



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Study Area: Detrital, Hualapai, and Sacramento Valley Basins
114°
114°30′
Lake
Mead
BLACK
Hoover Dam
36°
93
Colorado River
Detrital Valley
Hualapai
GARNET MOUNTAI
GRAND
Wash
Detrital
Wash
MOUNTAINS
WHITE HILLS
Red Lake
Hualapai Valley
WASH
Truxton
CLIFFS
Wash
CERBAT MOUNTAINS
ARIZONA
NEVADA
30′
Lake Mohave
67
Kingman
68
Bullhead City
BLACK
MOUNTAINS
HUALAPAI PEAK
HUALAPAI
MOUNTAINS
35°
Sacramento Wash
Sacramento Valley
40
95
CALIFORNIA
ARIZONA
MOHAVE MOUNTAINS
34°30′
0
10 MILES
0
10 KILOMETERS
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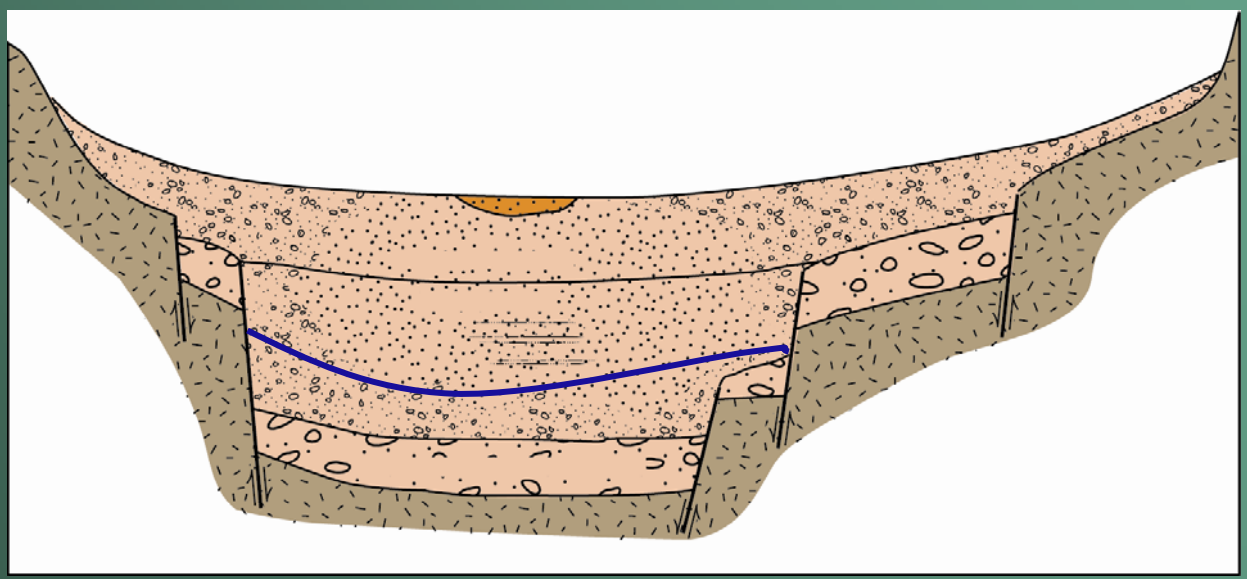
Key study area characteristics:

- Alluvial basins with basin-fill as primary aquifer



- Compared to other alluvial basins in AZ
  - Ground-water use is currently low; minimal surface-water use
  - Recharge is low
  - Ground-water is deep
    - Lack of perennial streams & aquatic/riparian habitat

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Fundamental study area issue and question:

- **Current and projected rapid increase in population & ground-water demand**

  Is there enough water to support the current and growing population?

  Managers & Planners

  How much ground water is

  - **In storage?**
  - **Recharges annually?**
  - **Discharges annually?**

  Scientists & engineers

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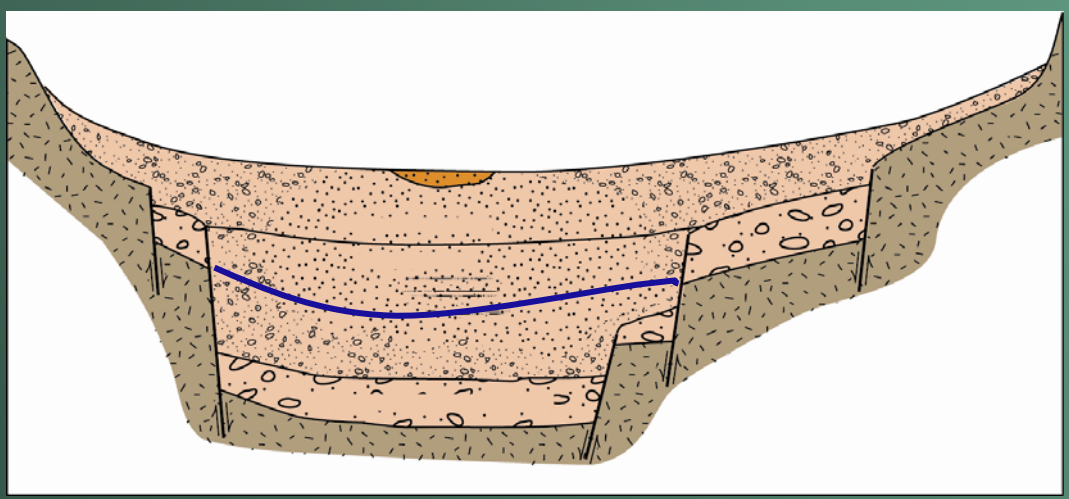
Study objectives:

- Develop improved estimates for ground-water recharge, discharge, and storage
  - Evaluate current and past conditions of ground-water levels and ground-water movement
  - Develop a better understanding of the extent and lithology of geologic units and structures,



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Study objectives

- Evaluate ground-water quality for key water uses
- Augment existing hydrologic-monitoring networks to detect and characterize changes in aquifer conditions
- Inform the hydrologic community, land & water managers, and basin residents about hydrologic conditions

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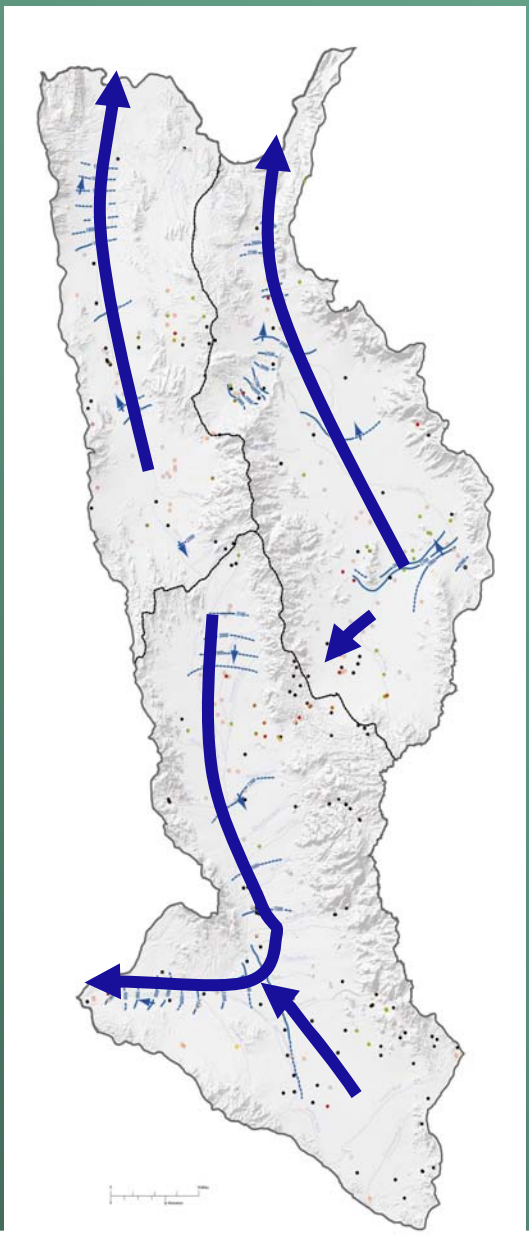
Methods: Evaluate current and past conditions of ground-water levels and ground-water movement

- Measured water levels in 330 wells during 2006
- Water-level map



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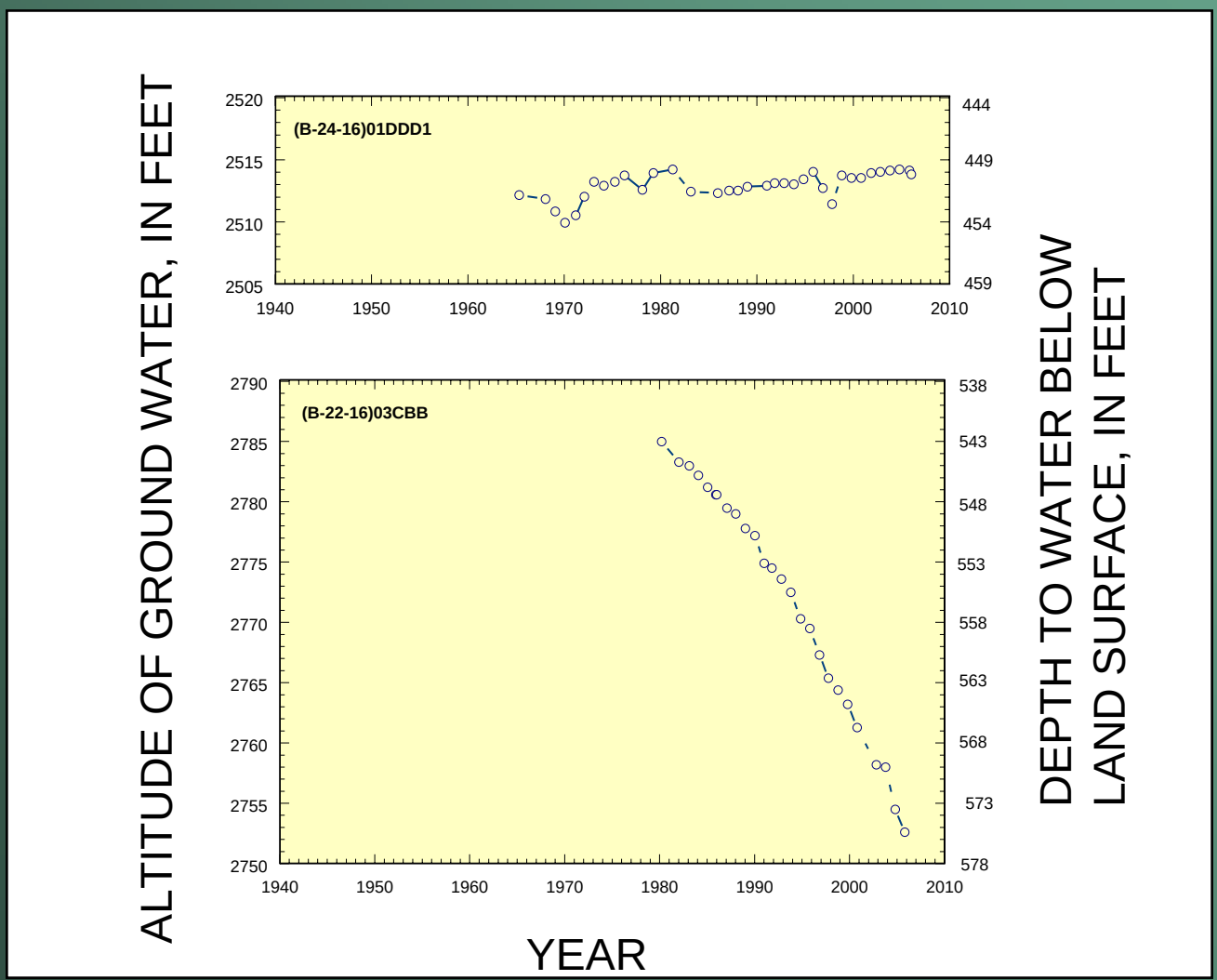
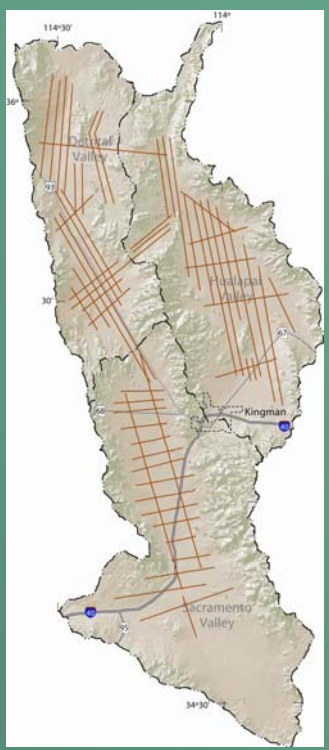
Methods: Evaluate current and past conditions of ground-water levels and ground-water movement

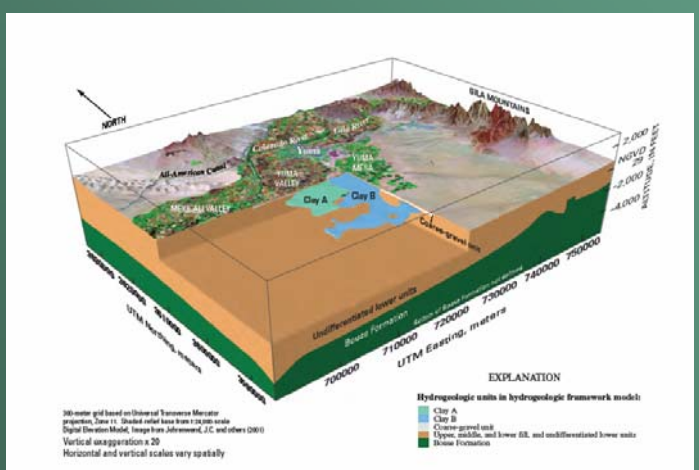
- Hydrographs



Method: Develop a better understanding of the extent and lithology of geologic units and structures, and their relation to the storage & movement of ground water

- **Data sources:**
  - Geologic maps & reports
  - Drillers logs of borehole cuttings
  - Gravity measurements
  - Ground and airborne geophysical surveys (TEM)
- **Geologic model**
  - 3-Dimensional, digital
  - Spatial extent of hydrogeologic units
  - Location of geologic structures





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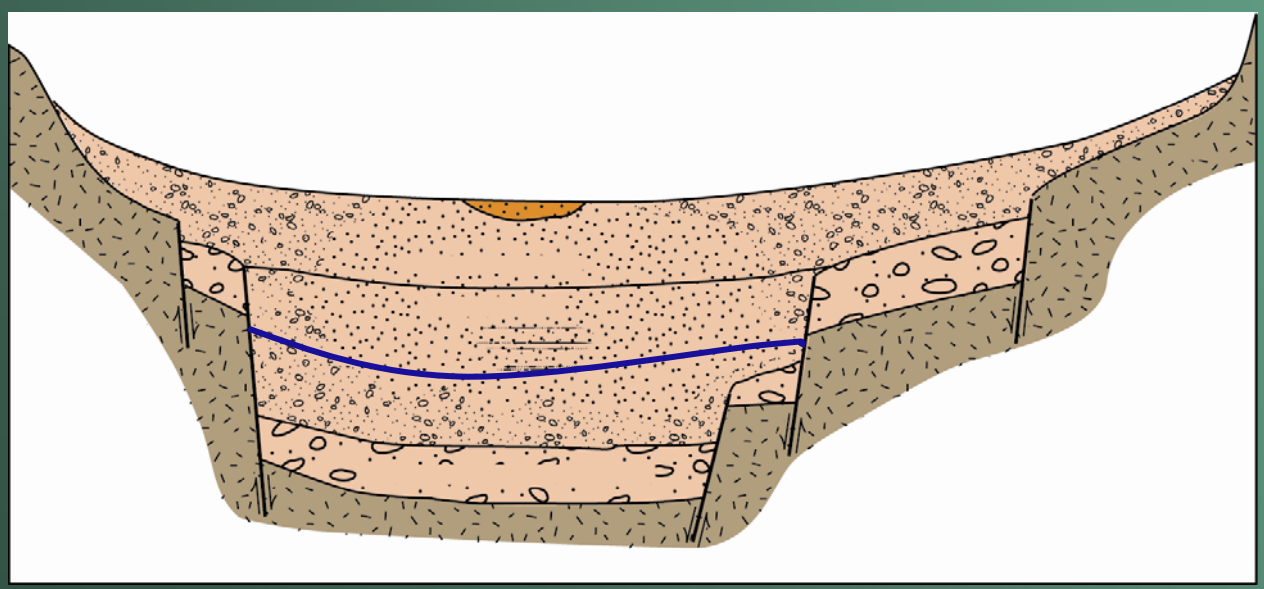
Method: Develop improved estimates for recharge, discharge, and total water in storage

- Computations based on:
  - Spatial information from geologic model
  - Ground-water levels and gradients from water-level map
  - Aquifer properties for hydrogeologic units



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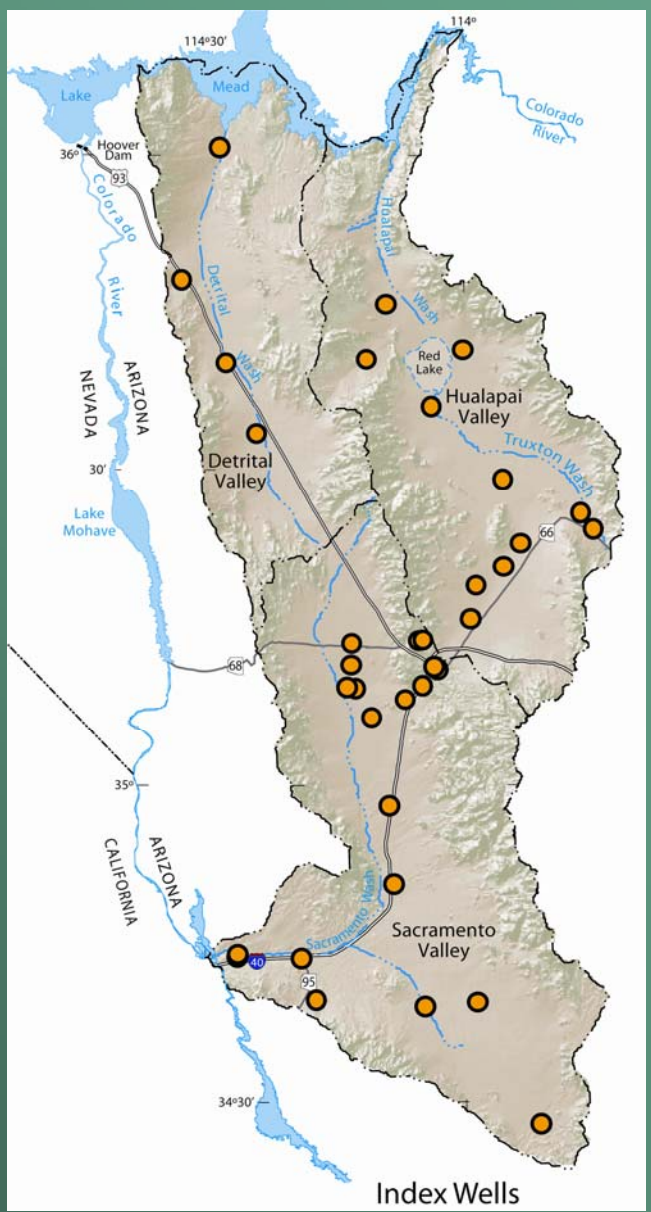
Method: Augment existing hydrologic-monitoring networks to detect and characterize changes in aquifer conditions

- ADWR Index Well Network
- Repeat gravity monitoring sites
  - Recharge rates
  - Discharge rates
  - Storage coefficients



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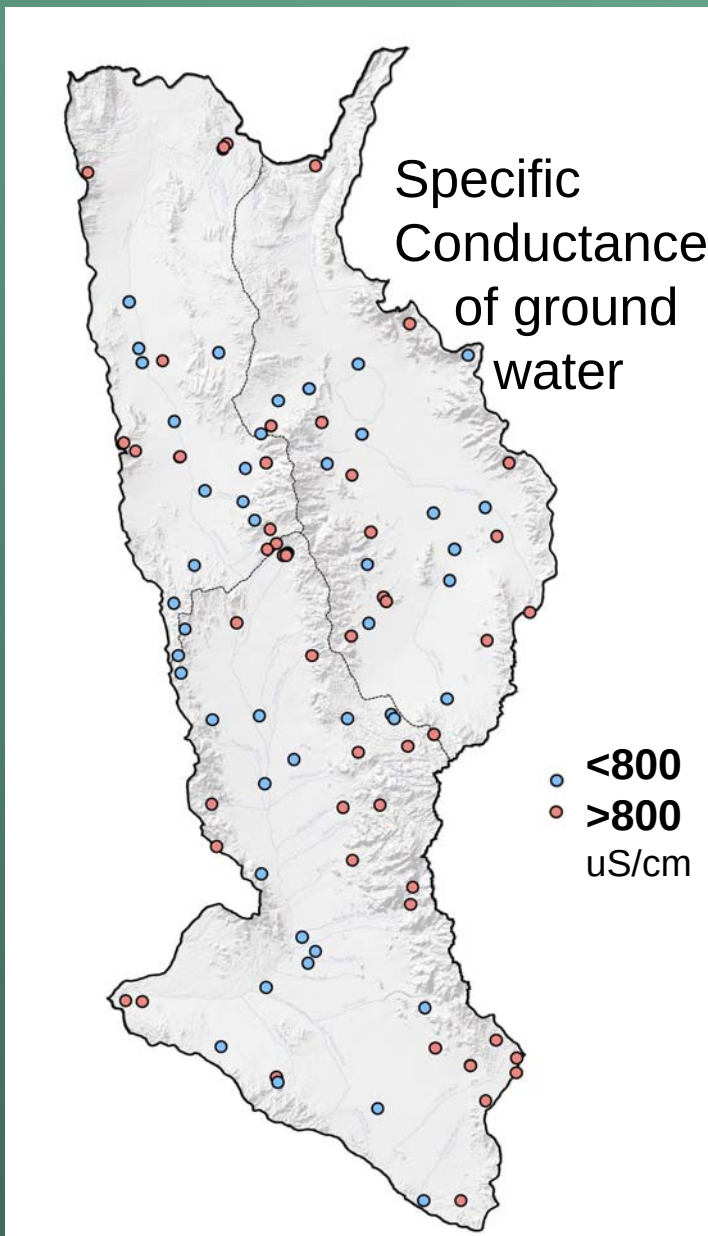
Method: Evaluate ground-water quality for key water uses

- Assess using new & existing data:
  - USGS, ADWR, ADEQ existing data
  - About 30 new ADWR & USGS samples
- Constituents
  - Major ions
  - Metals
  - Nutrients
  - Isotopes



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Method: Inform the hydrologic community, water managers, and basin residents about hydrologic conditions

- Communication:
  - Reports & fact sheets
  - Web page
  - Northwest Arizona Watershed Council Meetings
  - Mohave County fair / AZ Hydrologic Society Symposium
  - Phone & email

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Uses of data and information

- 100 year water-supply adequacy assessment for new developments
- Long-term planning – population and water supply
- Ground-water modeling to assess various development scenarios

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Questions/comments:

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http://az.water.usgs.gov/projects/C9Z00.html

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